Global view

Prevalence of and risk indicators for STIs among women seeking induced abortions in two urban family planning clinics in Shandong province, People's Republic of China

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Reproductive tract infections (RTIs) including sexually transmitted infections (STIs) in women are a major public health problem in many developing countries.[1] These infections in women are often asymptomatic and can cause a variety of complications and sequelae, if they are left untreated.[2] In developing countries pregnant women or women attending antenatal and family planning clinics have often been investigated in many studies to determine the prevalence of and risk factors for STIs in order to set up screening criteria.[3–7] However, only a few studies on the prevalence of STIs have been conducted in women seeking induced abortions.[8–10]

The prevalence and incidence of STIs including HIV infection have significantly increased since 1980s in China, owing to a series of political, cultural, social, and economic factors.[11 12] In order to control the growth of the population, induced abortion is one of the methods used for women who have an unwanted pregnancy for whatever reason. Condom use as a birth control method is low in China.[13] At the same time, the proportion of women who engage in sexual activities before marriage has been increasing and the age at first intercourse has decreased. These factors together create dual risks for both unwanted pregnancy and STIs among women of reproductive age. The purpose of this study was to (1) determine the prevalence of STIs; (2) identify factors significantly associated with vaginal and cervical infections.

MATERIALS AND METHODS

This cross sectional study was conducted from November 1999 to September 2000 in two family planning clinics of Jinan, the capital of Shandong. All pregnant women who were seeking induced abortions in the two clinics during the study period were asked to participate in the study, independent of the reason for abortion. Each woman was interviewed with a standardised interviewer administered questionnaire after a written informed consent was obtained. After interviewing, vulval examination was performed by clinicians and any sign indicative of an STI was recorded and diagnosed clinically. Subsequently, saline wet mount smears from the posterior vaginal fornix were taken and examined immediately for mobile trichomonas and clue cells. Another smear from the posterior vaginal fornix was taken and examined for candida with microscopy. After withdrawal of the speculum from the vagina, pH was measured and the results of a whiff test were recorded.

During speculum examination, samples were taken from endocervical canal for the test of *Chlamydia trachomatis* (CT) and *Neisseria gonorrhoeae* (NG), with DNA-PCR using a pooling method.[14] In addition, 5 ml venous blood was taken from each participant for the testing of HIV and syphilis. The test for HIV infection was performed with a commercial testing strip (Determine HIV ½, Abbott Laboratories, USA) according to the manufacturer's instruction. Any blood sample, which was positive for HIV infection using the determine test, was confirmed by western blot test. For the test of syphilis, treponema passive particle agglutination assay (TPPA, SERODIA-TPPA, Fijirebio Inc, Japan) was used to determine the cumulative seroprevalence of syphilis infection. The same blood sample was tested with toluidine red unheated serum test (TRUST)[15] to assess active syphilis.

RESULTS

The final analysis was based on the data from 2020 women out of 2056 women recruited. A total of 787 blood samples were tested for HIV infection and 503 blood samples were tested for syphilis. The average age of this population of women was 27.5 (SD 5.4) years. Ninety seven per cent of the women had received more than 6 years of schooling. Only 170 (8%) women were unemployed. Ninety four per cent of the women were from the city and 76.5% were married. The majority of women (98.1%) were in their first trimester. For 28% this was their first pregnancy. Sixty nine per cent reported at least one previous pregnancy. A total of 741 (36.7%) women did not have previous history of abortion. The reasons for abortion were family planning for 871 (43%); for being unmarried 460 (23%), and unwanted pregnancy for 383 (19%). Other reasons accounted for 15%. The mean age at first sexual intercourse was 23.1 (SD 2.4) years. Two hundred and forty six (12.2%) women had first sexual debut at an age younger than 20 years. Eighty eight (4.4%) women reported having more than one lifetime sexual partners and 64 (3.2%) women reported having a new sexual partner in the past 6 months. Seventy six (3.8%) women reported having previous RTIs (in the great majority this was trichomoniasis or candidiasis). Two thousand and eight (99.4%) women denied that their sexual partner had an STI.

When asked, 239 (11.8%) out of 2020 women reported genital itching, 136 (6.7%) vaginal discharge, and 94 (4.7%) lower abdominal pain. On inspection four women had genital ulcers and 16 women had genital and/or vaginal warts. On speculum examination 343 (17%) women were found to have abnormal vaginal discharge, 188 (9.3%) abnormal mucopurulent cervical discharge, 478 (23.7%) cervical erosion, and only 25 (1.2%) women had lower abdominal tenderness on bimanual examination. The prevalence of RTIs in the population is presented in table 1.

The risk factors studied varied in importance between the different STIs. In multivariate analysis, trichomoniasis was negatively associated with previous abortion (OR 0.50, 95% CI 0.28 to 0.90) and positively associated with never having used condoms (OR 3.36, 95% CI 1.66 to 6.80). The women with elicited genital pruritus were three times more likely to have trichomoniasis (OR 3.22, 95% CI 1.68 to 6.16) and women with elicited low abdominal pain 3.5 times more likely (OR 3.49, 95% CI 1.59 to 7.68). CT infection was not associated with any demographic characteristics, neither with previous history of pregnancy and abortion, nor with condom use, the use of contraceptives, or any sexual risk behaviours. However, abnormal vaginal discharge (OR 1.87, 95% CI 1.18 to 2.98) and cervical erosion (OR 1.92, 95% CI 1.25 to 2.94) on speculum examination were positively associated with an increased risk for the presence of CT. Women who had had a new sexual partner in the past 6 months were 3.8 times more likely to be infected with BV than women without a new sexual partner (OR 3.80, 95% CI 1.60 to 9.04).

History of RTI (OR 2.57, 95% CI 1.08 to 6.10), elicited genital pruritus (OR 2.55, 95% CI 1.41 to 4.60), and elicited abnormal vaginal discharge (OR 2.81, 95% CI 1.45 to 5.46) were also independently associated with BV (more details will be offered on request). The performance of the risk factors associated with the infections in multivariate analysis was very poor.

Table 1 Prevalence of RTIs among 2020 women seeking induced abortions in two urban family planning clinics, Shandong Province, China

STIs	Prevalence of STIs (%)		
	WCH (n=1185)	SPH (n=835)	Total (n=2020)
T vaginalis (TV)**	11 (0.9)	40 (4.8)	51 (2.5)
C albicans (CA)**	104 (8.8)	28 (3.3)	132 (6.5)
Bacterial vaginosis (BV)**	67 (5.6)	2 (0.2)	69 (3.4)
Any vaginitis**	172 (14.5)	70 (8.4)	242 (12.0)
C trachomatis (CT)	61 (5.1)	35 (4.2)	96 (4.8)
N gonorrhoeae (NG)*	2 (0.2)	7 (0.8)	9 (0.4)
Any cervicitis	63 (5.3)	42 (5.0)	105 (5.2)
Genital wart (GW)*	13 (1.1)	3 (0.4)	16 (0.8)
Syphilis (n=503)			
TPPA only	3 (1.19)	2 (0.8)	5 (0.99)
TPPA + TRUST	1 (0.2)	1 (0.2)	2 (0.4)
HIV (n=787)	1 (0.2)	0 (0)	1 (0.13)
More than one infections**	24 (2.0)	6 (0.7)	30 (1.5)
Any infection**	236 (19.9)	111 (13.3)	347 (17.2)

*p<0.05; **p<0.01.
WCH = Women and Children Hospital; SPH = Shandong Provincial Hospital.

DISCUSSION

In assessing the prevalence of and risk factors for STIs very few studies have involved women seeking termination of pregnancy.[8–10] In one study, a higher proportion of gynaecological symptoms was found in the abortion group compared with the non-abortion group.[8] We had two reasons for selecting this population of women for our study. The first one was that an unwanted pregnancy might be the result of unsafe sexual behaviour, which creates dual risks for both pregnancy and exposure to STIs. The second one was that the procedure during induced abortion might facilitate the transmission of lower genital tract infections to upper genital tract and may cause serious complications and sequelae. This was suggested in several studies, which found a significant association between post-abortion endometritis/salpingitis and the occurrence of *C trachomatis* at the time of surgery in one study[11] and a high proportion of pelvic infections developed during the postoperative follow up period among the women infected with *C trachomatis*.[16]

The prevalence of STIs was lower in this study population than in most other studies conducted in the populations of pregnant women or women attending antenatal and family clinics in developing countries.[3–7 17–19] Some important characteristics in this group of women could explain the differences. For example, the women in this group were older with a mean of 28 years and higher education level. More women were married (76.5%) and monogamous (95.6%). Few women had a new sex partner in the past 6 months (3%) or were unemployed (8%), and generally they were late in sexual debut (23 years on average). Nevertheless, an overall infection rate of 17%, in particular a rate of nearly 5% chlamydial infection and nearly 1% seroprevalence of syphilis are still a considerable level in a population considered to be at low risk. Currently, the diagnosis and decisions regarding the laboratory testing and treatment for reproductive tract infections in antenatal and family planning clinics are left to the individual clinician in Shandong. We have shown that there are two major problems in the management of genital tract infections among these "low risk" populations of women. One is that most women infected are often asymptomatic or only have mild symptoms.[20–22] If we use elicited symptoms as a starting point in the management of our clients, a large proportion of infected women would be missed. For example, out of 96 women with chlamydial infection detected, only 15 cases were elicited with genital pruritus, 12 with abnormal vaginal discharge, and seven with lower abdominal pain. The second reason is that none of these symptoms and signs is specific enough to indicate a particular STI.[23] This means that the accuracy of the provider's diagnosis based on symptoms and signs in many infected women, including our study population, is poor.[17]

Some selective screening programmes aiming to reduce the prevalence of chlamydial infection in industrialised countries have been shown successful.[24 25] Unfortunately, through this study we were unable to establish an algorithm or set of criteria as screening tool for STIs, especially for chlamydial infection. Apart from the low risk characteristic of this group of women, low prevalence of various STIs is another fundamental factor for the poor performance of screening tool in this study. Many recent studies, ours included, showed poor validity of algorithms, whether WHO recommended or modified locally.[26 27] It should be emphasised that the main aim of screening and treating women seeking abortions is to prevent post-abortal pelvic inflammation apart from reducing the prevalence of the infections.

We conclude that continuous effort should be made to develop a simple diagnostic test to identify those asymptomatic women infected with cervicitis, owing to the serious complications and sequelae caused by these infections. Periabortal antibiotics for all women seeking induced abortions could be another option, which was recommended through a meta-analysis.[28] Surveillance on syphilis with cheaper screening test such as RPR among women seeking induced abortions should be considered because of the serious impact of syphilis on women's health and that of their offspring.

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CONTRIBUTORS

CS, the study design, implementation of the study, quality control in the study settings, and preparation of the paper; AvdH, review of the study proposal, supervised the study settings, and preparation of the paper; SC, review of the study proposal, guideline of the preparation of the paper; LD, data entry and statistics; ZS and PY, laboratory testing; LC and YX, data collection; WL, coordination of the study.

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